

AMENDMENT UNDER 37 CFR 1.111

Application No.: 09/732,712

Atty Docket No.: Q57601

REMARKS

The Office Action of July 18, 2003 has been received and its contents carefully considered.

Claims 1 to 10, 13 to 16 and 22 are all the claims pending in the application, prior to the present amendment.

The Examiner has objected to the specification as containing subject matter which is not written in such a clear and definite form as to allow any practitioner in the art to use the method in its most efficient way.

The Examiner sets forth a detailed explanation of this rejection in Paragraph 3, beginning at page 2 of the Office Action.

The Examiner sets forth numerous reasons as to why she considers the specification to be objectionable. Many of these reasons are the same as those set forth in additional rejections and comments that the Examiner makes in other paragraphs of the Office Action.

Applicants discuss each of these reasons below.

(a) The Examiner states that the specification discloses measuring a trace amount of water in purified ammonia using IR. The Examiner states that while the goal of the method disclosed is measuring water present in the amounts of less than 10 ppm, 1 ppm and even less than 0.1 ppm, the reference gas used for such measurements is described as containing less than 10 ppm of water. The Examiner asserts it is not clear, how is it possible to quantitatively measure less than 1 ppm or even 0.1 ppm of water in analytical gas, when the reference gas may

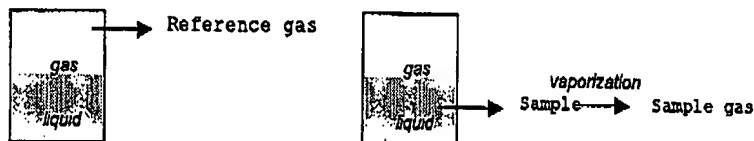
contain 10 and even 100 times more water than the analyte sample, especially the unknown amount of water in the reference gas?

(b) The Examiner further states that according to Figure 1, the reference gas and the analyte samples are taken from two separate tanks, which may contain different amounts of water, even if it less than 10 ppm each.

In response, applicants point out that in the embodiment illustrated in Figure 1 of the drawings, as the reference gas, ammonia gas is taken out of the gas phase in a liquefied ammonia container (i.e. ammonia gas in equilibrium with liquefied ammonia) and introduced into an IR gas cell. As the analyte sample (sample to be measured), if the sample is liquefied ammonia, liquid-phase ammonia is taken out of another container containing liquefied ammonia and after vaporization, introduced into the IR gas cell.

These concepts are illustrated schematically in the following Reference Figure 1.

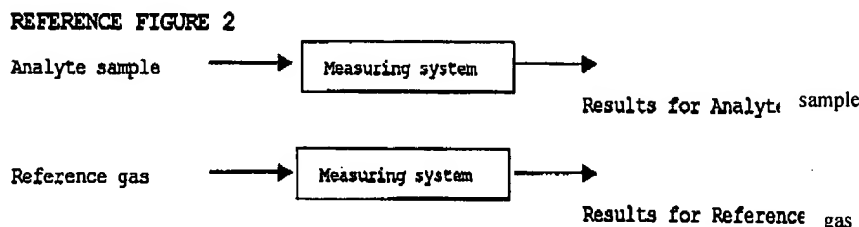
REFERENCE FIGURE 1



If it is assumed that the moisture levels in the liquid phases of the two containers are the same, the gas taken out from the gas phase of the container will contain a negligible amount of moisture in comparison with the liquid phase of the liquefied ammonia, and, therefore, can be used as the reference gas.

That is, in the present invention, in quantitative analysis by spectrometry, to eliminate effect of errors and bias of the measurement system, a reference gas whose moisture content can be considered as "zero" is used.

The following Reference Figure 2 schematically illustrates the two measurements that are made.



Results for the analyte sample contain background bias, errors etc. inherent to the system. Results for the reference gas also contain background bias, errors etc. inherent to the system.

Schematically, the concept of the present invention is illustrated by the following equation:

$$\text{Results for Analyte sample} - \text{Results for Reference gas} = \text{True value of the water content}$$

More precisely, the above equation is true only when the optical concentrations of the sample ammonia and the reference ammonia gas in the measurement cell are substantially on the same level, but this can be readily achieved by adjusting the pressure or temperature in the cell or by some calculative process.

In the present invention, the moisture content in the reference gas may be "less than 10 ppm" as the Examiner mentions (point (b) above), or may be much lower than 10 ppm. In other

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words, a gas having a moisture content as low as 10 ppm or less can be used as a reference gas in the measurement. See page 9, line 19 to page 10, line 4, of the present specification.

The specific moisture content in the reference gas can be determined by one skilled in the art according to the purpose of the measurement. If the object of the measurement (sample gas) has a very high purity, the reference gas used for measuring the moisture amount of the sample gas may be prepared by taking the gaseous phase in equilibrium with the liquefied ammonia which the sample gas is taken from. This will ensure that the reference gas will have a water content that is substantially lower than the water content of the sample gas.

(c) The Examiner states that the measurements are taken at certain wave numbers, corresponding to the ranges where water and ammonia signals are not overlapped. The Examiner states that since nothing is said about measuring (running) IR spectra for reference gas and analyte samples first, it is not clear, if actually the real IR spectra are taken.

(d) The Examiner states that if actual IR spectra are taken no subtraction of the IR spectrum of the reference from the IR spectrum of the analyte is discussed, although using IR spectrum of the reference gas as the background is mentioned. The Examiner states that therefore it is not clear, if such subtraction takes place, or not.

(e) The Examiner states that if both IR spectra are measured, but no subtraction takes place, then it is also not clear, how correction for the huge signal of NH_3 is done.

(f) The Examiner states that it is not clear, how measuring the intensities of the signals at certain wavelengths, where there is no overlap between NH_3 and water, e.g. where there is no signal of water at all, can provide information on water content?

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In response, applicants point out that in the process for measuring absorbance of water in ammonia gas, the first step is to measure the IR spectrum of the reference gas consisting of matrix gas (ammonia) which contains no moisture (or a negligible amount of moisture) by using the measurement system. The next step is measuring the IR spectrum of the sample gas using the same measurement system. The sample gas consists of a matrix component (ammonia) which contains moisture as the measuring object.

As the final step, the IR spectrum of the moisture amount as the measuring object can be determined by subtracting the IR spectrum of the reference gas from the IR spectrum of the sample gas.

The measurement is made at a wave length range in which there is a signal for water and in which water and ammonia signals do not overlap. See page 10, lines 5 to 17 of the present specification. That is, both the analyte sample and the reference gas are actually measured on the IR spectrum. Further, since there is no signal for NH_3 , there is no need for correction for a NH_3 signal.

In addition, although the Examiner states that nothing is said about measuring IR spectra for reference gas and analyte samples first, applicants point out that the present specification at page 10 does discuss obtaining a calibration curve for determining the water concentration, and independent claims 1 and 22 each refer to the water concentration calibration curve.

Moreover, although the role of the reference gas is apparent from the term "background" disclosed at page 13, lines 3 to 5 of the present specification, applicants would consider amending the claims to incorporate a recitation about the subtraction if the Examiner considers it appropriate.

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In view of the above, applicants request the Examiner to withdraw the objection to the specification.

Claims 1-10, 13-16 and 22 have been rejected under the first paragraph of 35 U.S.C. §1.112 as being based on a non-enabling disclosure.

The Examiner sets forth a detailed statement of this rejection in Paragraph 4, beginning at page 3 of the Office Action.

The Examiner sets forth numerous reasons why she considers these claims to be based on a non-enabling disclosure.

Applicants discuss each of these reasons below.

(a) The Examiner asserts that the specification, while being enabling for a reference gas with an exact amount of water, which should be much less than the water content of the analyte under measurement, does not reasonably provide enablement for a reference gas with an unknown amount of water, which also may exceed the water content of the analyte by 10 and even by 100 times. The Examiner asserts that the specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims. The Examiner asserts that there is no way for any one of ordinary skill in the art to measure amounts of water in the analyte sample in ranges of 1 ppm and even 0.1 ppm, using a reference gas with an amount of water 10 and even 100 times higher, especially when this amount is not known

(b) Moreover, the Examiner asserts that no one of ordinary skill in the art can measure the amount of water without obtaining full IR spectrum in the range of water

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absorbance, which is not recited in the claims.

(c) The Examiner also asserts that since it is well known that the water signal and NH_3 signal overlap, the correction for NH_3 signal should take place.

(d) The Examiner states that measuring the intensity of the signal at a wave number at which ammonia and water signals do not overlap does not make sense, if such a wave number is not in the range of the water signal.

In response, applicants refer the Examiner to applicants' above responses to the rejection in Paragraph 3 of the Office Action, points (a) and (b) and points (c), (d), (e) and (f).

(e) The Examiner states that in claim 22, it is not clear, what is the difference between two gases - one used as a reference gas with an unknown amount of water < 10 ppm, and another being an analyte, obtained by heating liquefied ammonia with an unknown amount of water < 10 ppm?

(f) In addition, the Examiner states that in claim 22, it is possible that heating liquefied ammonia will lead to an increased amount of water content due to the water evaporation from the liquefied ammonia; however, it is not clear, how is it possible to measure one unknown amount of water using another unknown amount of water, especially when the samples are coming from different tanks (Figure 1), which by definition have different amounts of water? The Examiner states this embodiment is not clear.

In response, applicants point out that the reference gas is ammonia gas which is taken out only from the gas phase of a container filled with liquefied ammonia. On the other hand, the analyte sample is a gas taken out of a liquid phase generally of another container filled with

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liquefied ammonia, and is vaporized when introduced into the IR gas cell, accompanied by moisture which derives from the liquid phase.

In view of the above, applicants request withdrawal of this rejection.

Claims 1-10, 13-16 and 22 have been rejected under the second paragraph of 35 U.S.C. §112 as indefinite.

The Examiner sets forth a detailed explanation of this rejection in Paragraph 6, beginning at page 4 of the Office Action.

The Examiner sets forth numerous reasons as to why she considers the claims to be indefinite.

Applicants discuss each of these reasons below.

(a) The Examiner states that claims 1 and 22 recite, "measuring infrared absorption intensity of the reference gas". The Examiner states that it is not clear how it is possible to measure infrared absorption intensity of the gas as a whole, when the gas comprises at least two components, ammonia and water, having different absorption intensities in the IR spectrum, depending on their content?

(b) The Examiner states that the same problem exists for the expression "infrared absorption intensity of the sample". The Examiner states that it is possible to measure "infrared absorption spectrum of the sample", but not the intensity, since intensity is the parameter of the signal, rather than the whole spectrum.

In response, what is meant by the expression "measuring infrared absorption intensity of the reference (sample) gas" in claims 1 and 22 is measuring the intensity of the absorption signal

of the reference (sample) gas. Applicants submit that this would be readily understood by one of ordinary skill in the art.

(c) The Examiner asserts that it is not clear from the claims, what is the difference between "a gaseous phase moiety of liquefied ammonia having a water concentration of 10 ppm or less" serving as a reference gas, and "ammonia as a sample"?

(d) The Examiner asks whether the reference gas contains exact and known amount of water?

(e) The Examiner asks that if it does not contain exact and known amounts of water, how can it be a reference gas? In addition, the Examiner asks what is "ammonia as a sample", and, asks is it liquefied ammonia, or a gas?

In response, applicants point out that in a container filled with liquefied ammonia, there are a liquid phase and a gas phase. The reference gas is taken out of the gas phase, while the sample gas as the object of measuring moisture, which may be taken out from either state, has only to be in a gaseous state when introduced into the optical cell, and if the sample gas is taken out from the liquid phase, it is vaporized before being introduced into the gas cell.

(g) The Examiner states that the expression "measured intensity of the sample" in the last subparagraph of the claims (1 and 22) is not clear. The Examiner asks what does it mean and how can the sample have intensity?

(h) The Examiner also asks whether this is a measured intensity of the absorption signal of water or something else?"

(i) The Examiner asks the "background absorption intensity" of which component is

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meant in the last sentence? The Examiner states again that "intensity" refers to a certain signal, and it cannot be referred to an entire spectrum.

In response, and as the Examiner states, what is meant by the expression "measured intensity of the sample" is a measured intensity of the absorption signal of the sample gas. Applicants submit that this would be readily understood by one of ordinary skill in the art.

(j) The Examiner states that claim 22 is unclear as to what is being measured and what is being used as a reference gas. The Examiner states that claim 1 recites "introducing a gaseous phase moiety of liquefied ammonia having a water concentration of 10 ppm or less as a reference gas". The Examiner further states that claim 22 recites, "measuring a water concentration in ammonia having a water concentration of 10 ppm or less", wherein as the first step the "gaseous phase moiety of liquefied ammonia" is introduced as a reference gas. The Examiner asks how these two gases, the one that is measured and the one that is used as a reference gas, differ?

In response, applicants point out the reference gas used in the method claimed in claim 22 is the same as the reference gas used in claim 1, i.e. "the gaseous phase moiety of liquefied ammonia". What is measured in claim 22 as a sample gas is a "gas vaporized by heating liquefied ammonia".

(k) The Examiner states that since the term "a gaseous phase moiety of liquefied ammonia" is not defined in the specification in clear and unambiguous terms, and it is not clear, if this is a gas of crude ammonia, or refined gas, a gas containing a known amount of water, an unknown amount of water, a negligible amount of water, etc., the Examiner will interpret this

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term in the broadest meaning, i.e. as any ammonia gas, obtained from liquefied ammonia, which contains less than 10 ppm of water.

In response, applicants point out that the purity of the reference gas need not be clearly defined in the present invention, that is, it does not matter whether the ammonia which the reference gas is taken from is a crude product or a refined product. The main object of the present invention is related to provision of a simple method for measuring the moisture amount present in ammonia.

In view of the above, applicants submit that the claims are not indefinite and, accordingly, request withdrawal of this rejection.

Claims 1, 2, 5-10, 13, 15 and 16 have been rejected under 35 U.S.C. §103(a) as obvious over Kastle et al and Girard et al.

The Examiner sets forth a detailed statement of this rejection in Paragraph 10, at page 6 of the Office Action.

The Examiner states that the Kastle et al publication is not available to the Examiner at the present time, and instead she relies on the description of Kastle et al that appears in the Wu et al article (Anal. Chem.).

The Examiner states that Wu et al indicate that Kastle et al disclose all of the recitations of the present claims, except for the use of a reference gas as a background. The Examiner relies on the Girard et al publication, which is newly cited, for a disclosure of the use of a purified NH_3 as a reference gas and subtracting its spectrum as a background. The Examiner argues that it would have been obvious to employ such a reference gas in the Kastle et al method.

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The portion of Wu et al that the Examiner is relying appears at page 3316 of Wu et al. Applicants have previously discussed this portion of Wu et al, and have stated that Wu et al do not disclose the use of a reference gas in connection with the Kastle et al method. The Examiner now relies on Girard et al to show the use of a reference gas.

The Examiner states that Girard et al disclose measurements of water traces (in ppb) in NH_3 by NIR (sic, near IR) using purified NH_3 gas as a reference, subtracting its spectrum as a background, and also indicate that this method can be used for determining remaining moisture in purified gases used in microelectronic manufacturing industry.

The Examiner argues that it would have been obvious for any one of ordinary skill in the art to modify the Kastle et al method (in the case it does not comprise this step already) by using reference purified NH_3 gas in order to obtain the background spectrum, which is subtracted from the spectrum of the analyte, because it obviously improves the quality of the water content measurements due to corrections of the spectrum for the presence of remaining NH_3 signal.

Wu et al disclose at page 3316 that in the Kastle et al method, a detection limit of a few ppm was obtained, and this result was due to the limitation of high background moisture level.

With respect to Girard et al, applicants submit that it does not disclose or suggest using the gaseous phase moiety of liquefied ammonia as a reference gas. Girard et al teach a method for measuring trace moisture in ammonia by using a diode laser. The wave length employed in the Girard method is 7306cm^{-1} and 7327cm^{-1} . While Girard et al appear to disclose using ammonia as a reference gas, there is no disclosure that the ammonia is a gaseous phase moiety of liquefied ammonia. The ammonia gas employed as a reference gas in Girard et al is obtained by “a point of use purifier”, and is not a gaseous phase moiety of liquefied ammonia.

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The Girard et al article contains a section "4-Measurement in NH_3 ," at pages 327-328 where Girard et al discuss measurements in ammonia.

Applicants submit that Girard et al do not employ a reference gas in the same way as the present invention. In particular, Girard et al do not disclose or suggest a reference gas that is a gaseous phase moiety of liquefied ammonia.

Further, applicants submit that the absorption peaks of 7306 and 7327 cm^{-1} that are referred to at page 327 of Girard et al do not satisfy the recitations of the present claims with respect to wave number.

Applicants submit that one of ordinary skill in the art would not be led to combining the statement in Wu et al concerning the Kastle et al technique with the Girard et al article, and submit that the combination of these two teachings would not lead to one of ordinary skill in the art to arrive at the present invention.

Thus, the Kastle et al technique had absorption lines at 1923.162 and 1922.342 cm^{-1} , whereas Girard et al had absorption peaks at 7306 and 7326 cm^{-1} , which were not interference free. These absorption peaks of Girard et al were in the near IR, and are not the infrared absorption employed in the present invention or in Kastle et al.

Studies were made on what gas could be a reference gas (a gas whose moisture amount was negligible), and as a result the present invention was achieved based on the finding that gaseous phase moiety of liquefied ammonia containing as little moisture as negligible can be used as a reference gas. See page 9, line 19 to page 10, line 4 of the present specification.

Therefore, the present invention could not have been anticipated by prior art references only describing about use of "gas having a little moisture" or a "refined gas" as a reference gas.

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Moreover, in conventional methods, reference gas requires refining while the method according to the present invention does not include a refining process for the reference gas, which is one of the main features of the present invention.

In view of the above, applicants submit that the cited prior art does not defeat the patentability of the present claims and, accordingly, request withdrawal of this rejection.

Claim 14 has been rejected under 35 U.S.C. §103(a) as being obvious over Kastle et al and Girard et al for the reasons stated in Paragraph 10 of the Office Action, and further view of Muromura et al.

The Examiner sets forth a detailed statement of this rejection in Paragraph 11, beginning at the bottom of page 6 of the Office Action.

The Examiner states that Kastle et al and Girard et al do not specify the way of drying ammonia, but that Muromura teaches drying an ammonia gas stream using sodium metal.

The Examiner argues that it would have been obvious for anyone of ordinary skill in the art to apply Kastle and Girard's method of measuring water trace in ammonia, which is dried according to Muromura's method, because the aim of Kastle-Girard's method is determining remaining moisture in dried ammonia.

In this rejection, the Examiner relies on Muromura for teaching the drying of an ammonia gas stream with sodium metal. The Examiner argues that it would have been obvious to dry the ammonia in accordance with the Muromura technique.

Claim 14 is a dependent claim. Thus, applicants submit that claim 14 is patentable over these references for the same reasons as set forth above in connection with the rejection in paragraph 10 of the Office Action.

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Further, Muromura teaches a method for drying an ammonia gas comprising passing the ammonia gas stream through a liquefied ammonia maintained at the boiling point and in which sodium metal is dissolved. Uranium mononitride (UN), which reacts easily with the moisture at 1400-1500°C to convert to uranium dioxide, is used as an agent for determining the moisture, and the moisture is determined from the change in the weight between the uranium mononitride and the uranium dioxide. Therefore, the invention of Muromura, is irrelevant to the present invention, and neither teaches nor suggests the present invention.

In view of the above, applicants submit that claim 14 is patentable over the cited prior art and, accordingly, request withdrawal of this rejection.

In Paragraph 12, beginning at page 7 the Office Action, the Examiner sets forth a variety of comments and questions that respond to the arguments applicants' presented in the Amendment under 37 C.F.R. § 1.111, filed on April 30, 2003.

Many of the points that the Examiner makes appear to be substantially similar or identical to previous arguments as set forth in Paragraphs 3, 4 and 6 above. The Examiner states that since the rejections over the prior art are changed in the present Office action, no response to the remarks related to the prior art will be made, as the remarks are not relevant to the present rejections.

Applicants discuss the points raised by the Examiner.

(a) The Examiner states that the question of the Examiner, what is meant by the expression "measuring infrared absorption intensity at an infrared wave number", is not answered neither by the Amendment, nor by the applicants' explanations. The Examiner asserts that as indicated in

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the rejection of the claims above, it is impossible to measure IR absorption intensity of a gas or a sample, if they are mixtures, which is the instant case. The Examiner states that water and ammonia give absorption signals in IR spectrum, the intensities of which are defined by the concentrations of water and ammonia in the gas and the sample, and which therefore should differ from each other, since water and ammonia do not comprise 1:1 mixture in the gas and the sample. The Examiner states that the expression "infrared absorption intensity of the gas (or the sample)" is technically incorrect and does not make sense. The Examiner states that what actually is measured for the reference and the sample is the IR absorption spectrum, rather than intensities.

In response, applicants refer the Examiner to applicants' above response to the rejection in Paragraph 3 of the Office Action, points (c) to (f), and to applicants above comments in response to the rejection in Paragraph 6, points (a) and (b) and points (g) to (i).

(b) The Examiner states that applicants' arguments regarding the reference gas with less than 10 ppm of water, considered basically free of water, are not convincing not only in the light of the prior art of Wu, but in light of applicants' own disclosure. The Examiner asks how can the sample with less than 1 ppm (even 0.1 ppm(!)) of water (claims 7 and 8) be measured with the reference with 10 ppm of water, especially when this amount of water is ignored in the reference as insignificant?

(c) The Examiner states that measuring the water content in the samples with the reference sample containing 10 and even 100 times more water than the samples themselves, and for which even this amount of water is considered to be insignificant and is ignored, does not have any

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technically reasonable basis.

In response, applicants point out that the water content in the reference gas does not necessarily have to be 10 ppm. The reference gas may contain water at any concentration of 10 ppm or less as far as the concentration is ignorably low in comparison with the water content in the sample gas as the measuring object.

(d) The Examiner states regarding claim 22 and non-clarity as to what is measured and what is considered a reference for the method recited in the claim: while the applicants explained the difference between the reference gas and the sample with the amount of water to be measured, first, this difference is still not apparent, and second, the method itself remains non-understandable with the applicants' explanations confusing and contradictory.

(e) The Examiner states regarding the difference between the gaseous phase moiety of the liquefied ammonia and gas ammonia: it is known that ammonia has a boiling point at -33°C , which makes it a gas at room temperature and atmospheric pressure. The Examiner states that to liquefy ammonia high pressures are used, and to evaporate ammonia, it is enough to decrease the pressure. The Examiner states that if both, the reference and the sample are introduced into the measuring cell under atmospheric pressure and room temperature, it is hard to understand, what should be the difference between these two, as gas is easily obtained from liquefied ammonia at atmospheric pressure? In other words, what should be the difference between two portions of ammonia from tanks 9 and 10 on Figure 1 before one of the portions is heated in the heater? Aren't they both gaseous phase moieties of the liquefied ammonia? Is this heating that makes them different?

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In response, applicants point out that a step of taking out the liquid phase of ammonia from a container where liquid phase and gaseous phase coexist is generally employed. The difference between the liquid phase moiety of liquefied ammonia subjected to heating to evaporate and the gaseous phase moiety of liquefied ammonia is that the former, which derives from the liquid phase, contains more impurities (moisture) than the latter.

(f) The Examiner states that the method itself is not clear, and applicants' explanations are confusing. The Examiner states that applicants indicate that the reference gas and the sample are purified to the same extent, which is confirmed by the recitation of the claim that both, the sample gas and the reference gas contain less than 10 ppm of water. This statement itself brings a question - if the reference sample with such amount of water is considered to be practically free of water, then why the sample with the same amount of water is not considered to be free of water and requires measurement of the water content.

(g) In addition, the Examiner asks if water quantity is about the same in both reference and the sample, with the water content in the reference unknown but basically neglected, then how is it possible to measure the water content in the sample with any accuracy?

(h) Further, the Examiner states that applicants' statements on page 9 of the previous Amendment, in the two last paragraphs contradict each other. In the first paragraph, the applicants state that the reference gas and the sample under measurement are purified to the same extent ("or higher" without specifying how much higher). In the second paragraph, applicants state that "the water concentration in the reference gas may be known or as small as ignorable in comparison with the water concentration in ammonia which is the object to be measured". So,

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are the sample and reference purified to the same extent (with less than 10 ppm of water), or does the sample have a much higher amount of water?

In response, applicants point out that the liquefied ammonia from which the reference gas used in the present invention is taken out is present in the liquid phase and in the gaseous phase in a container, and the reference gas is taken out only from the gaseous phase of liquefied ammonia.

If the water concentration of the liquid phase in the container from which the reference gas is taken out is on the same level with the water concentration of the liquid phase of liquefied ammonia from which the sample gas is taken out from, the water content of the reference gas (taken from the gaseous phase) is as low as negligible in comparison with the water content of the sample gas (taken out from the liquid phase). Therefore, the moisture of the sample can be measured by using the reference gas. The water content of the sample gas can be measured in comparison with the water content of the reference gas by a measuring method conventionally known.

(j) The Examiner states that the arguments regarding purifying ammonia are not quite clear. The Examiner asks what does not require purification - the reference gas? It is taken from one of two tanks, and therefore it is not clear, how the gas from one first tank must be purified while from the other - not?

In response, applicants point out that in the present invention, the reference gas (taken out of the gaseous phase of liquefied ammonia) and the sample gas (taken out of the liquid phase of liquefied ammonia) may be taken out from one container or from different containers.

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(k) The Examiner states that a discussion of a gas-liquid partition coefficient is irrelevant both to the Office Action and applicants' Amendment as the gas-liquid partition coefficient is not the subject matter of the pending claims.

(l) The Examiner states that, moreover, it is not clear, where the number 1/100 for this coefficient comes from and what it has to do with the claimed method?

With respect to the number 1/100, the moisture ratio between the gaseous phase and the liquid phase is a value inherent to the substance (liquefied ammonia) and the temperature. The value can be obtained by using a conventionally known method. See also the paragraph "MODE FOR CARRYING OUT THE INVENTION", pages 8 to 10, of the specification, and especially the last paragraph on page 9 where the gas-liquid partition coefficient is discussed and the values 0.01 and 0.1, which correspond to 1/100 and 1/10, are mentioned.

As described above, the coefficient value range (1/10 to 1/100) is inherent to the substance (liquefied ammonia). The water concentration in the gaseous phase moiety is the result of the gas-liquid partition coefficient since the gaseous phase moiety is a gaseous phase of liquefied ammonia. Applicants have added new dependent claims 23 and 24 that recite the 0.01 and 0.1 values.

In view of the above, applicants submit that the specification is enabling and the claims are not indefinite.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the

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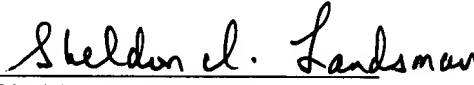
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Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,


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Date: January 20, 2004